

## Claims

1. An illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to the light emitting portion of the light emitting tube, and a second reflector which is arranged on a front side with respect to the light emitting portion, characterized in:

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that a heat capacity of the front-side electrode of said pair of electrodes as is surrounded with said second reflector is made larger than a heat capacity of the rear-side electrode.

2. An illumination apparatus as defined in claim 1, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

3. An illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to the light emitting portion of the light emitting tube, and a second reflector which is arranged on a front side with respect to the light emitting portion, characterized in:

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that an electrode shaft which supports the front-side electrode of said pair of electrodes as is surrounded with said second reflector is made thicker and/or longer than an electrode shaft which supports the rear-side electrode.

4. An illumination apparatus as defined in claim 3, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

5. An illumination apparatus including a light

emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to the light emitting portion of the light emitting tube, and a second reflector which is arranged on a front side with respect to the light emitting portion, characterized in:

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that said sealing portion located on the front side is made thicker than said sealing portion located on the rear side.

6. An illumination apparatus as defined in claim 5, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

7. An illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a

sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to the light emitting portion of the light emitting tube, and a second reflector which is arranged on a front side with respect to the light emitting portion, characterized in:

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that said sealing portion located on the front side is coated with a heat radiation material which is higher in thermal conductivity than a material of said sealing portion.

8. An illumination apparatus as defined in claim 7, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

9. An illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first

reflector which is arranged on a rear side with respect to the light emitting portion of the light emitting tube, and a second reflector which is arranged on a front side with respect to the light emitting portion, characterized in:

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that a wall thickness of that front side of said light emitting portion of said light emitting tube which is surrounded with said second reflector is greater than a wall thickness of a rear side of said light emitting portion.

10. An illumination apparatus as defined in claim 9, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

11. An illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect

to the light emitting portion of the light emitting tube, and a second reflector which is arranged on a front side with respect to the light emitting portion, characterized in:

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that an end part of the front-side electrode of said pair of electrodes as is surrounded with said second reflector is held in touch with an inner surface of said light emitting tube.

12. An illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to the light emitting portion of the light emitting tube, and a second reflector which is arranged on a front side with respect to the light emitting portion, characterized in:

that said second reflector is attached to said sealing portion located on the front side, so that its

reflection surface may surround substantially front half of said light emitting portion;

that a pair of electrode shafts which support said pair of electrodes, respectively, are included;

that said pair of electrode shafts are respectively furnished with heat conduction parts at their end parts on sides on which they are connected with said pair of electrodes; and

that a heat capacity of the heat conduction part of the front-side electrode of said pair of electrodes as is surrounded with said second reflector is made larger than a heat capacity of the heat conduction part of the rear-side electrode.

13. In a projector having an illumination apparatus, and an optical modulation device into which light from the illumination apparatus is entered and which modulates the entered light in accordance with given video information;

a projector characterized in:

that said illumination apparatus is an illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween,

a first reflector which is arranged on a rear side with respect to said light emitting portion of said light emitting tube, and a second reflector which is arranged on a front side with respect to said light emitting portion;

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that a heat capacity of the front-side electrode of said pair of electrodes as is surrounded with said second reflector is made larger than a heat capacity of the rear-side electrode.

14. An illumination apparatus as defined in claim 13, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

15. In a projector having an illumination apparatus, and an optical modulation device into which light from the illumination apparatus is entered and which modulates the entered light in accordance with given video information;

a projector characterized in:

that said illumination apparatus is an illumination apparatus including a light emitting tube which has a



light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to said light emitting portion of said light emitting tube, and a second reflector which is arranged on a front side with respect to said light emitting portion;

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that an electrode shaft which supports the front-side electrode of said pair of electrodes as is surrounded with said second reflector is made thicker and/or longer than an electrode shaft which supports the rear-side electrode.

16. An illumination apparatus as defined in claim 15, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

17. In a projector having an illumination apparatus, and an optical modulation device into which light from the illumination apparatus is entered and

which modulates the entered light in accordance with given video information;

a projector characterized in:

that said illumination apparatus is an illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to said light emitting portion of said light emitting tube, and a second reflector which is arranged on a front side with respect to said light emitting portion;

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that said sealing portion located on the front side is made thicker than said sealing portion located on the rear side.

18. An illumination apparatus as defined in claim 17, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

19. In a projector having an illumination apparatus, and an optical modulation device into which light from the illumination apparatus is entered and which modulates the entered light in accordance with given video information;

a projector characterized in:

that said illumination apparatus is an illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to said light emitting portion of said light emitting tube, and a second reflector which is arranged on a front side with respect to said light emitting portion;

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that said sealing portion located on the front side is coated with a heat radiation material which is higher in thermal conductivity than a material of said sealing portion.

20. An illumination apparatus as defined in claim 19, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

21. In a projector having an illumination apparatus, and an optical modulation device into which light from the illumination apparatus is entered and which modulates the entered light in accordance with given video information;

a projector characterized in:

that said illumination apparatus is an illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to said light emitting portion of said light emitting tube, and a second reflector which is arranged on a front side with respect to said light emitting portion;

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that a wall thickness of that front side of said light emitting portion of said light emitting tube which is surrounded with said second reflector is greater than a wall thickness of a rear side of said light emitting portion.

22. An illumination apparatus as defined in claim 21, characterized in that an end part of at least one of said pair of electrodes is held in touch with an inner surface of said light emitting tube.

23. In a projector having an illumination apparatus, and an optical modulation device into which light from the illumination apparatus is entered and which modulates the entered light in accordance with given video information;

a projector characterized in:

that said illumination apparatus is an illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to said light emitting portion of said light emitting tube, and a second reflector which is arranged on a front side with respect to said light emitting

portion;

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion; and

that an end part of the front-side electrode of said pair of electrodes as is surrounded with said second reflector is held in touch with an inner surface of said light emitting tube.

24. In a projector having an illumination apparatus, and an optical modulation device into which light from the illumination apparatus is entered and which modulates the entered light in accordance with given video information;

a projector characterized in:

that said illumination apparatus is an illumination apparatus including a light emitting tube which has a light emitting portion performing light emission between a pair of electrodes, and a sealing portion located on a front side and a sealing portion located on a rear side with the light emitting portion interposed therebetween, a first reflector which is arranged on a rear side with respect to said light emitting portion of said light emitting tube, and a second reflector which is arranged on a front side with respect to said light emitting

portion;

that said second reflector is attached to said sealing portion located on the front side, so that its reflection surface may surround substantially front half of said light emitting portion;

that a pair of electrode shafts which support said pair of electrodes, respectively, are included;

that said pair of electrode shafts are respectively furnished with heat conduction parts at their end parts on sides on which they are connected with said pair of electrodes; and

that a heat capacity of the heat conduction part of the front-side electrode of said pair of electrodes as is surrounded with said second reflector is made larger than a heat capacity of the heat conduction part of the rear-side electrode.